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ASSESSING THE HUMAN FACTOR IN TRUCK DRIVING

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Review article

Abstract: Human factors assessment techniques are commonly applied to a variety of workplaces to examine the nature of operations and how key functions are controlled operationally; however, these tools appear to overlook key aspects of truck driving, particularly the driver's relationship to the driving experience. The fundamental issue is with the ability to completely decompose truck driving and accurately document the truck drivers working environment will be problematic. Therefore, to demonstrate how a truck driver moves between each series of sub-tasks will require a purpose-built assessment tool that that is both practical and relevant to truck driving.

Keywords: Human factors, Truck drivers, Ergonomic assessments, Road transport system Truck driving, Task assessments.

Introduction

Human factors in road transport is the application of knowledge about human abilities, limitations, physical conditions and psychological states and their relationship to the driving experience (Transportation Research Board, 2012). In order to do this most road transport companies will undertake an evaluation of what a truck driver does undertake during the movement of freight by road over the course of a given period.

In terms of truck driving and developing a detailed understanding in what truck drivers might do will include provisions that acknowledge the truck driver already possesses the required skills, capabilities and qualifications that enables them to operate any vehicle which meets all standards as prescribed by law (NHVR, 2018). The assessment tool that is integrated into the road transport arena should be able to demonstrate to the truck driver and others how the given tasks will be completed and ideally include the relationship the truck driver has with the ever-changing environment that is influenced by changes in contemporary work patterns, increased the demand for goods and services and urbanisation (Mooren et al., 2014). In addition, the assessment tool selected should contain sufficient information that demonstrates to a truck driver what is expected of them as it is presented in such a way that if the truck driver applies what is written, both the assessment tool and the practical application will be identical (Hunt et al., 1993).

Materials and methods

To develop comprehensive understanding into the purpose of common ergonomic assessment tools, a wide range of literature was obtained through academic search engines. Societal and Technical papers and government reports and other materials to include a volume of online grey literature. To compare each assessment tool in a practical setting, key road transport operational personnel documented common truck driver related tasks, according to the framework applied by the assessment tool. The activities of truck drivers was observed to compare the manner the tasks were completed by the truck driver and the way they were described. A range of common ergonomic assessment tools were selected for this comparison that underpin the premise each tool can identify the task being completed by the worker is within their capabilities and limitations.

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Results

Whilst driving any vehicle is as individual as it is similar, the problem with applying a standardised human factors tool into truck driving is that the assessment does not make allowances for the improvements in trucking that includes ergonomically designed seating, vibration suppressors and a multi-level 18-speed manual transmission and other technology that is commonly found in modern trucks (Peter, 2013; Wang et al., 2010). Neither do they consider, the influence the vast array of in-vehicle technologies that have been designed to accurately reflect the functional performance capabilities of the vehicle, that is designed to assist the truck driver determine if the vehicle is responding within normal limits (Powar et al., 2009) must also be taken into account.

This means that to accurately describe all the tasks which a truck driver undertakes during their normal duties may be more complicated than other industries, the selected human factors assessment tool must be adapted to reflect how the tasks described will be completed in the truck drivers normal work environment, show where the driver fits in the system as well as what role they play (Kieras and Butler, 1997) and present alternatives if the demands of the task exceed the driver capabilities (Mathew and Rao, 2007; Blumenthal, 1967).

This is because all truck drivers will respond to changes in the workplace which may not have been captured in the assessment. Thus, the standard ergonomic assessment tools cannot be integrated into truck driving in the exact manner they were designed, without extensive modifications. Nevertheless, to develop an assessment tool that is relevant and appropriate to this industry, it must draw on the foundations of multiple assessment tools and show how the sequence of sub-tasks flow from beginning to completion and identify where the truck undertakes appropriate actions that are caused by disruptions.

Assessing Complex Adaptive Systems

The road transport industry is a complex adaptive system that is intractable and to apply these resources accurately, to accurately map human performance is going to be problematic, because human performance is inherently unreliable and the skills and abilities truck drivers draw on will vary from individual to individual as the task complexity increases, (Evans, 1985; Woodruff, 1952; Annett et al., 1971). The experienced truck driver will have developed a number of character traits (Lewis-Evans et al., 2011), driving habits and intuitive driving techniques over an extended period of time and while these will aid them to respond to the changes that may be found in their physical location and calculate all road variables (Bergasa et al., 2006), the task correlation between the sensory, emotional and social behaviours will not occur when the truck driver responds to changes in the behaviours of other road users (Toledo et al., 2007; Fox et al., 2010).

To apply the current assessment tools that are available to truck driving will not clearly demonstrate to any person how a task or series of tasks is actually completed (Annett and Stanton, 2000) and identifies a set of activities and attributes or requirements a truck driver may need for a road transport company. Roberts and Glick (1981) suggested that this is because most organisations over-invest in the desired outcome and have an unwillingness to consider just how challenging any situation truly is by insisting it is simple. This indicates that the assessment tool selected may not be suitable for the truck driving environment, as the descriptions and sequence applied in the assessment are based on how the assessment can demonstrate the relationship these tasks have with customer demand and not the abilities of the truck driver.

Presuming that when the task is described by the transport company it will reflect the way the task should be completed from the beginning through to completion (Annett and Duncan, 1967). However, the assessment fails to consider all the complexities involved in truck driving and may not recognise how the driver responds to any given situation that is found during the continual monitoring of their surroundings (Stahl et al., 2014). In order to consider how truck driving may be decomposed and fully understood a number of human factors assessment tools are traditionally used. However, for truck driving these tools are problematic when used in isolation. The challenges of applying these tools in isolation for the task of truck driving is now discussed.

Standard Human Factors Assessment Tools

Hierarchical Task Analysis

If the assessment tool selected is to be applied to the truck driver workplace, it must be able to integrate complex and high-risk functions into the relationship these have with each other. To apply this premise to any design, it would appear that the Hierarchical Task Analysis (HTA) seems to cover many of the components; however,

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the HTA may not be accurate in showing where all of the sub-tasks can be found or demonstrate how these lead onto the next series of tasks with certainty (Nelson, 1997). Whilst the HTA has the ability to identify a truck drivers cognitive workload and highlight unnecessary sub-tasks and tasking errors (Annett and Duncan, 1967; Stanton, 2006), it appears to be overly dependant on the ability to replicate what is described in the same linear fashion that can be shown in practice.

To demonstrate this, a common assignment was selected that most truck drivers will complete in a normal work period was and applied to the HTA (see Fig. 1), and even as it shows the main sub-groups that a truck driver is likely to progress through to complete the task, the HTA does not enable all of the secondary and tertiary tasks to appear in the sequence. Despite this, by using the HTA, each of the actions documented can be verified in practice and support how they might fit into the sub-group (Chipman et al., 2000), which makes the goal of the HTA, the successful completion of the task. Other issues within the HTA is that it is overly simplistic and unless the number of sub-tasks is increased to show every possible action a truck driver may undertake during this task, the sequence being described will not reflect the way the task is conducted.

This raises the question of reliability into the HTA in terms of truck driving and as it does not appear to allow for actions that are influenced by individual characteristics and behaviours and the intuitive driving techniques (Bergasa et al., 2006; Chipman et al., 2000), because the foundations of the HTA will not accept frequent adaptations of the task that reflect how the truck driver interprets the environment (Burton et al., 2003). Making it impossible for the HTA to clearly demonstrate what happens in the task sequence when something does not feel right, or when weather patterns, potential collisions and other variables occur that will disrupt the planned sequence. Therefore, the relationship the driver has with the task instructions will match what s written in the HTA on most occasions; however, when considering all the complexities found in driving, the HTA falls short as a reliable resource.

Sequencing Diagrams

To understand the standard series of functions a truck driver may undertake, without being able to evaluate the information-processing architecture found in human multiple-task performance (Kieras and Meyer, 1997) a secondary assessment tool is required to support the HTA and address the deficiencies in its design. This may be the reason that a sequencing diagram be introduced to identify the missing elements and allow for a more detailed picture that presents how the truck driver moves from one task to the next. The problem discovered by Odell et al. (2000) is that most of these diagrams depend on a standard representation to support any analysis. This would mean that the sequence described in these diagrams has already been predetermined and contains events that contradict normal driving behaviours.

Fig. 1 Truck Driving - Hierarchical Task Analysis Adapted from (Moe et al., 1973)

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Nevertheless, these diagrams should be able to pictorially display the *information-decision-action* sequence (Kurke, 1961) and highlight the discrepancies in the HTA, to demonstrate a more precise and objective understanding how each of the tasks flow between one point and the next until the sequence is completed (see Fig. 2) (Zhang and Zhang, 2007). The issue with these diagrams is the basic principles of safe driving is reliant on the volume of information the truck driver can assimilate and react to at any given moment (Ferdinand and Menachemi, 2014), meaning that the sequence diagram may not be able to accurately reflect how the truck driver completes the task when the volume of information has reached capacity. Indicating that the diagram presents a degree of uncertainty and the linear time-sequence that is the foundation of these diagrams may not be able to reflect any actions that are pre-emptive and based on experience alone.

To remove any vagueness the type of diagram chosen must allow for fluidity between behaviours and actions, because even as the task is being carried out, the truck driver may not complete it in the prescribed manner as the sequence changes the moment something unexpected is encountered. Making the diagram in its current state only able to be identical to what is written in HTA and overly simplify the critical aspects that the truck driver may encounter, or have them overlooked or omitted (Wallace et al., 2000) to accurately demonstrate the process the truck driver will apply to successfully complete the task (Sepos, 2005).

To replace this diagram with an Operational Sequence Diagram (OSD) could benefit the assessment; even though these types of diagrams were originally designed to represent complex multi-person tasks, by modifying the framework the actions undertaken in the truck driving environment should start to reflect the sequence relationship the truck driver has with the task and the environment and demonstrate the role the truck driver plays (Kieras and Meyer, 1997; Kirwan and Ainsworth, 1992). This is because the OSD provides a clinical rationalisation and a visual representation into the relationship between one set of tasks and the next (see Fig. 3).

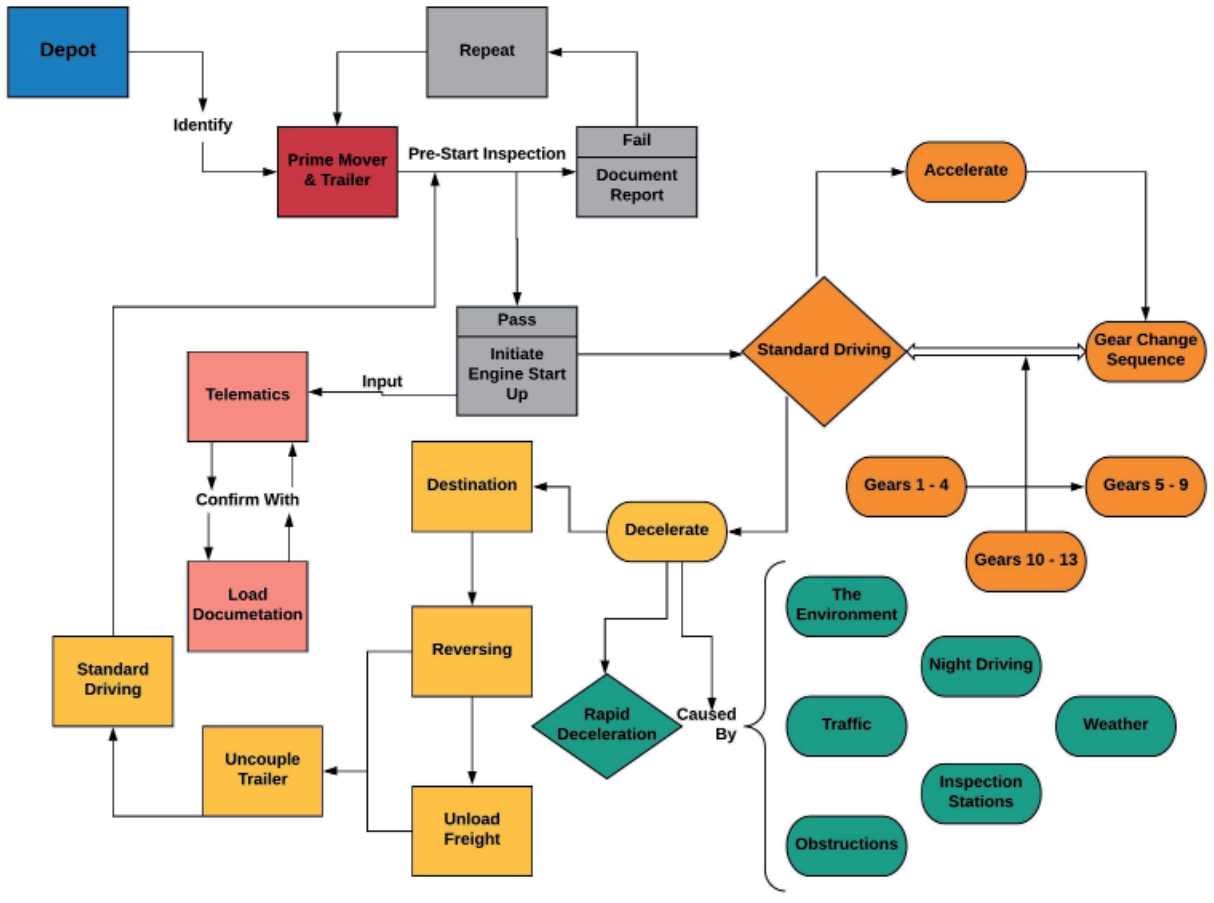

Fig. 2 Driving Sequencing Chart

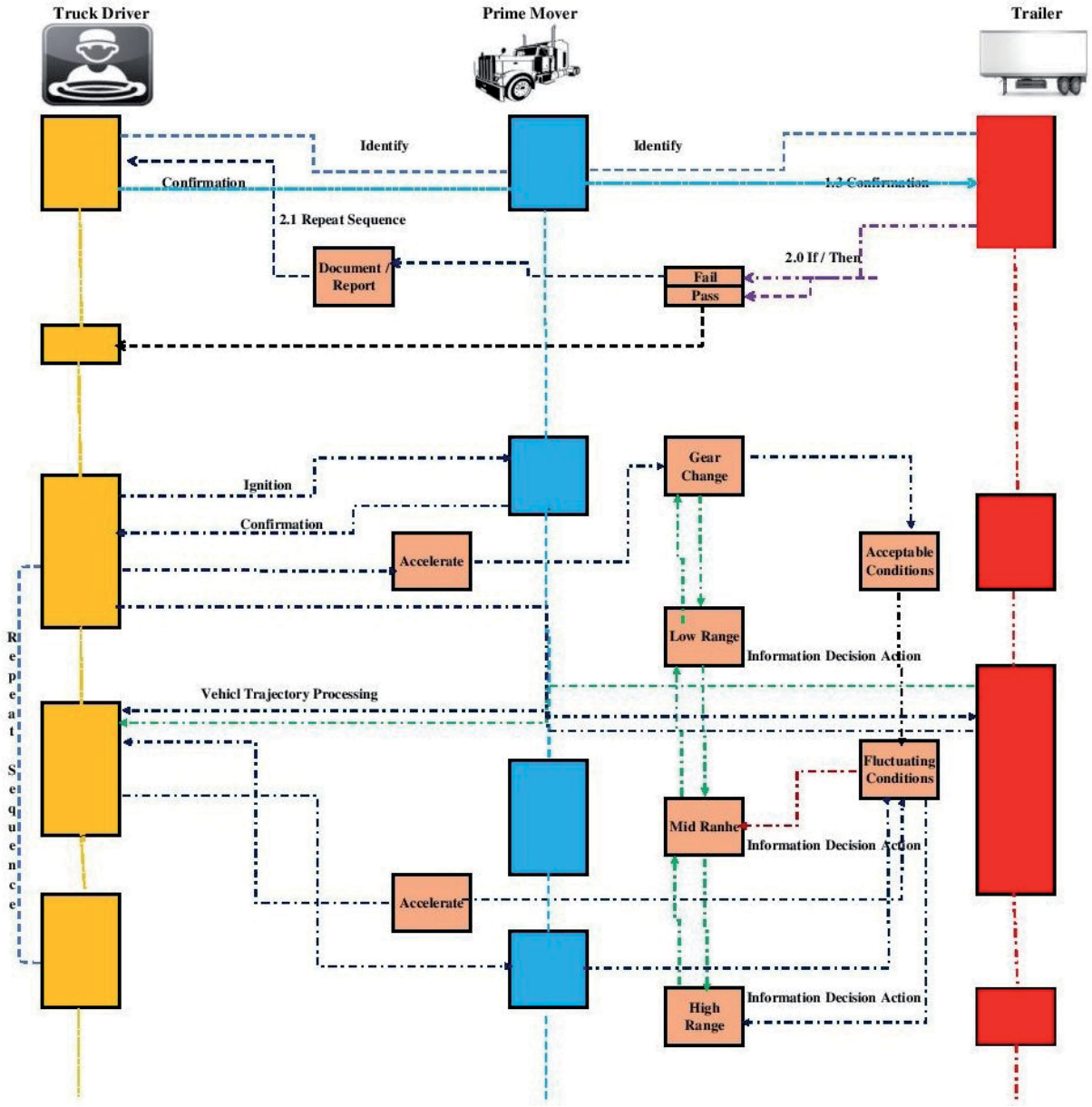

Fig. 3 Operational Sequence Diagram Adapted from (Brooks, 1960)

One of the major issues with the OSD in deciding what to describe, how to describe it and what level of detail should be included (Annett and Duncan, 1967) and even if these issues can be resolved at some level, the completed OSD has additional problems as it may not be able to clearly represent all of the actions of a truck driver, or accurately reflect the sequence of events which a truck driver may follow in a linear fashion, unless every known variable is removed. However, this may create a sequence diagram that does not demonstrate how the truck driver moves between each series of tasks or show the relationship between the driver, the vehicle and the environment.

Nevertheless, by including all of the scenarios that may be encountered by a truck drive and the location of the decision-action-interaction relationship under normal conditions requires the OSD to be reformatted into a complex multi-layered document, which is likely to create a diagram that is incomprehensible (Lenné and Triggs, 2009). Particularly as elements in normal driving are hinged on how and where the information is sourced and the actions are driven by what outcome is favourable, meaning that the truck driver is more likely to pause the sequence, change the sequence or cease it all together (Kirwan and Ainsworth, 1992). Indicating that the OSD or other sequencing diagram will only

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be able to clearly show a linear task sequence for truck driving when the if/then scenario is included that validates where the source of information is derived from and how this influences any decision being made.

Cognitive Task Analysis

Specific cognitive processes will be applied by the truck driver when driving and these will need to be examined in greater detail to understand how the truck drivers cognitive function or the processes by which they perceive, register, store, retrieve and apply the information influences the task completion (Bushnell and Tilson, 2010). Given the fact that the OSD and HTA may present some useful insights, Summerskill et al. (2016) conceptualise that truck drivers have a shared control of all sensory properties, which traditionally will diffuse the number of spatial discrepancies that present themselves (Knight et al., 2008) and by offsetting gaps in the sequence calculation will allow the driver to accurately track each object, in relation to the movement of their vehicle and its place in the sequence.

Von Wallpach and Kreuzer (2013) describes this as cognitive fusion or the process that allows a singular object to become multi-dimensional and meaningful. However, if a truck drivers' mood will significantly influence driver behaviour, this fusion will be altered somewhat because mood will influence a truck drivers actions and behaviours. Even though there are numerous test platforms that are designed to capture the feelings people have (MNair et al., 1971), the assessment platforms reviewed were not designed for road transport making the responses not accurately reflect the relationship between a drivers mood and completing the task without being significantly modified to show how mood impacts on rational cognitive decisions (Terry et al., 2003; Morfeld et al., 2007; Curran et al., 1995).

The Cognitive Task Analysis (CTA) may benefit the findings in any other test platform; however, as a limited number of decisions made by the truck driver are observable and many are overly complex, they are beyond the scope of the CTA. Even so, the five distinct phases in the CTA can yield information from different perspectives and it should be able to start to explain the relationship the truck drivers information-decision-action sequence has on the task sequence (Vicente, 1999). The reason that this may be valuable, is that the CTA has broad phases that can draw out the tacit knowledge and thought processes of the truck driver and if applied correctly, the CTA can uncover how the cognitive activities are utilised and develop a deeper understanding into how the truck driver makes judgements and decisions or interprets situations and use cognitive skills to perform the task (Watkins et al., 2012). These discoveries can be underpinned by assessing the truck drivers mental workload (Crandall et al., 2006) and identify the critical decision points (Klein, 2008).

It could be argued that the Executive Process-Interactive Control (EPIC) model be considered at this point, as it should be able to present a greater degree of understanding into what the truck driver does, during any given task. EPIC can highlight when and where the task sequencing failures occur and provide a detailed analysis in how these limitations can be improved on (Meyer and Kieras, 1997; Meyer and Kieras, 1997). Nevertheless, the reliability within EPIC is questionable as it does not understand the importance that truck drivers place on their awareness to comprehend their physical location or calculate all road variables (Bergasa et al., 2006; Riener and Wintersberger, 2011) that may be encountered at any given time. Inferring that EPIC is applied on the basis that the test subject has sufficient working memory to understand what is being described (Baddeley, 2003; Baddeley, 2003) and has ample knowledge to identify and use all of the individual components that are required to complete the task being assessed, which may not be the case in all situations.

This means that EPIC fails to address several elements within the assessment and because of this the Subjective Workload Assessment Technique (SWAT) be looked at more favourably as it may be able to close the gaps in understanding the truck driver - task sequence relationship. The issue with these types of assessments is that while they are intended to provide a greater insight into how the truck driver perceives the task being assessed by subjectively assessing the foundations of the task, they may not be able to define the truck driver and the task being conducted in context, as these assessments are also not designed for the truck driving environment. The premise that by adopting the SWAT platform (see Fig. 4), should be able to link the multi-dimensional nature of driving with individual levels that are contained within standardised dimensions (Reid et al., 1982; Reid et al., 1989), to provide a greater insight into the perceived workload that is associated with truck driving and the task being examined (Vidulich and Wickens, 1986).

Even as these templates can provide a more holistic view of the assessment and identify how the task is influenced by actions that are made by controlled deliberation and others that are rapid or almost rigid (Hancock et al., 1990). The scales applied to the measurement makes it insensitive to

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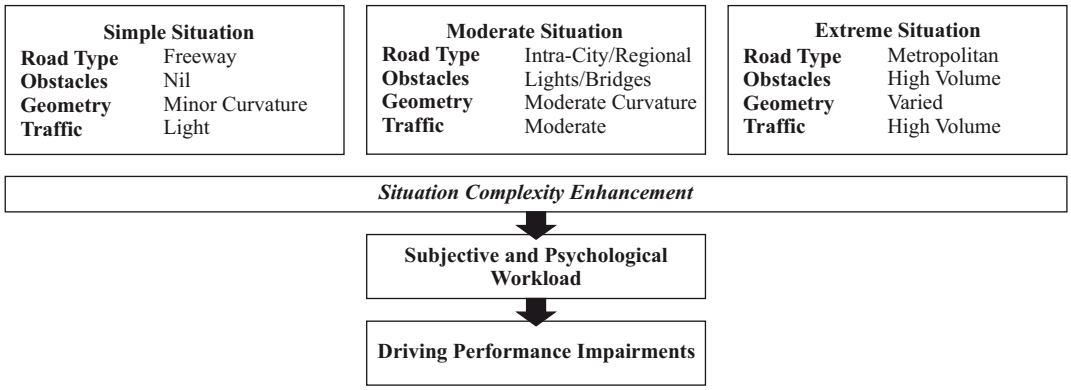

Fig. 4 Predictors of Mental Workload Adapted from (Paxion et al., 2014)

workloads that are low (Hart and Staveland, 1988), meaning that additional levels need to be added (Nygren, 1991), to show the perceived workload in more detail. Indicating that the interactions between the requirements of the task and the circumstances under which it is performed as well as the skills, the behaviours and emotional state of the truck driver, and their perceptions can be understood first before the mental workload is defined with certainty (Hart and Staveland, 1988).

The problem with adding more levels to SWAT is that the evaluation becomes prone to error and as it does not contemplate the visual, auditory, biomechanical or physical and cognitive disruptions that occur or that a large percentage of driving time is taken up with physical or behavioural distractions (Sullman, 2012), the influence these distractions have on a truck drivers mental workload is not considered (Ghazizadeh and Boyle, 2009). Implying that before the actual rating of the workload can be given for a task, the results obtained must be adjusted against the limitless number of distractions that all truck drivers become accustomed to, which makes the current application of the assessment either unreliable or incorrect, especially during complex manoeuvres. Wang et al. (2011) also points out that a similar result will be encountered when driving conditions fluctuate as the mental workload will fluctuates and influence the pattern that simultaneous multiple actions will be undertaken to ensure the truck responds in the manner that is intended without impeding that actions of other road users.

This may indicate that the truck driver's situational awareness will need to be assessed and even as situational awareness is perceived to be a complex construct, it will be experienced by every individual at some level (Selcon et al., 1991). By applying the Situation Awareness Rating Technique (SART) (Taylor, 2017) or other multi-dimensional resource, the post response scaling technique, allows truck drivers to overlook low situational awareness or embellish periods where superior situational awareness was experienced. Meaning that the resource is prone to manipulation, which indicates that the reliability, validity and sensitivity that the assessment is attempting to achieve may not be maintained in this environment (Endsley et al., 1998).

The issue with identifying a singular assessment tool that has value in defining the task of truck driving is in their accuracy and the appearance they have in only being useful to measure how the task will be conducted in a stationary or sterile environment. As this creates further complications to describe the information in a design that it reflects the actions, as they are carried out. For example a simple task of changing gears in a standard Road Ranger gearbox that is commonly found in most trucks (Wang et al., 2010), will be limited to the number of actions that can reasonably be described; however, if the truck driver experiences an event that has not been forecasted by the designer, the number of actions that are actually completed, cannot be defined in the same manner.

The second major concern is that most of these documents assume that every person driving a truck between two points, will conduct themselves in an identical and predictable manner. However, as human behaviour is anything but predictable and unless all the variables are included the value these have in explaining how 'Task A leads onto Task B and so-on' (Nelson, 1997), the consistency they are attempting to achieve will only reflect the organisational performance expectations are fixed to ensure that the successful outcome they have been designed for is achieved. Stanton (2006) puts forward this is partly due to the fact that whoever is

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developing these types of documents that typically apply predictive anticipation to the process that combines technical skills with individual expertise that involves careful planning and forecasting with reliable data (Obhi et al., 2009).

Cognition and Truck Driving

The primary challenge in mapping a task sequence correctly is to understand the effects inattentional or perceptual blindness, will influence the decisions and actions made by the truck driver, that arise when the truck drivers line of sight is corrupted (Fitch et al., 2011), or when the truck driver initiates a series of actions that are based solely on an assumption (Tran and Trivedi, 2012). This is particularly relevant for truck drivers as unexpected objects are noticed more frequently (New and German, 2015; Gao and Jia, 2017) and the prevalence of inattentional blindness increases with age (Stothart et al., 2015; Graham and Burke, 2011; Horwood and Beanland, 2016).

A large part of a truck drivers mental processing occurs outside of conscious awareness and as truck drivers apply both types of conspicuity more frequently than other drivers. Truck drivers tend to rely heavily on sensory conspicuity to make the physical properties of the information being processed become conspicuous. They also frequently apply cognitive conspicuity, which is contingent upon the characteristics of the truck driver and the familiarity they have with objects, road signage or other stimuli (Custers and Aarts, 2010). Indicating that the assessment tool must allow for how the truck driver simultaneously processes multiple inputs and outputs and continually makes physical adjustments because they have already decided on the consequences that may arise prior to initiating the action (French et al., 1993).

This means that any assessment technique used must factor in the truck drivers normal behavioural traits (Dahlen et al., 2012) and understand how the truck driver perceives any issues that may present itself over the entire journey, particularly when they evaluate how the appropriate actions taken will influence the assigned delivery schedule of the consignment. In effect, the process applied by the truck driver will include trading any anticipated gains that may be envisaged prior to the beginning of the task through a multi-layered series of approximations that are based on what the information is, how it's processed and what, if any consequences may eventuate (Hollnagel, 2017). This is one of the reasons that the assessment resource must include multidimensional variables that allows for simultaneous multiple actions (Wang et al., 2011) which allow for frequent episodes of task disengagement (Seli et al., 2013) that may compromise the homogeneity between the external and internal environment (Morgan and Hancock, 2009).

Solutions

The road transport industry occupies an important position in the trans-shipment of goods across a highly diverse landscape and organisations tend to measure the manner which a truck driver completes every task by applying a standard series of assessment tools that are designed to clearly demonstrate what the driver can do. However, these assessment tools may not understand truck driving in the context that clearly demonstrates truck driving and assesses all the abilities, limitations, physical conditions and psychological states or the human relationship to the driving experience (Transportation Research Board, 2012). As the assessment tools appear to focus on the completion of the task or series of tasks and not the relationship the truck driver has with the road transport system because the presumption is that truck driving, like all other work practices, can be described in finite detail.

If all assessments focus on the human factor (Adams, 1923; Long, 1926) or the physical person, the scientific foundations that are applied to the road transport environment must include individual behavioural characteristics and their influence in completing all functions in the prescribed manner. The problem with this is some of the assessments used presents a degree of confusion into how the task or series of tasks can be shown in a linear fashion as many will represent what is required of truck drivers for that company. Furthermore, the available assessment tools that are commonly used have not been specifically designed for truck driving and because of this, they will require some degree of modification to ensure that what is being examined can be accurately described and reflected in practice.

Individualistic Assessments

In respect of an assessment resource that will work for the truck, driving environment is going to be difficult because human performance will vary from individual to individual (Evans, 1985; Woodruff, 1952). At the same time, to apply the assessment tool as a resource, must benefit the inexperienced truck driver and as drivers that gain more experience, because the assessment should be able to uncover any contradictions in the task sequence; thus, changing the opinion that every truck driver will complete every task

the same way and drive every vehicle identically (Clay-Williams et al., 2015). Meaning that the deficiencies within every assessment will no longer apply the same range of skills to operate any motor vehicle or consider that every truck driver drives a truck exactly the same as all other truck drivers and accepts that the way the task is described will be applied differently (Fox et al., 2010).

To select an assessment model that can be applied to the truck driver, it must understand the dynamics of truck driving and explain the relationship between the inner workings of the brain and body and its responses to specific situations (Crystal and Ellington, 2004) with some clarity as well as categorise the standard driver actions and comprehend the driver perception-action. This is important when examining the foundations for some of the models, as they appear to be based on preconceived ideas of how to drive the vehicle in the first place (Haring et al., 2012; Taatgen, 2005). Meaning that if the model selected has these foundations, it will create more questions than provide answers for and any value to the assessment may be limited to the theoretical or simulated environment.

Whilst this presents the notion that no singular human factors assessment tool can be applied to the truck driver, the tasks that they will undertake or the road transport environment, most of the models currently applied can be modified to some degree. However, the modification must allow for the influence that any visual, auditory, biomechanical or physical and cognitive disruption (Ghazizadeh and Boyle, 2009) has on the task sequence, as this will change the way the task is described in the assessment model. Indicating that task sequence as described in the model is not going to be accurately demonstrated, unless additional layers have been added that factors in all of the possible causes for disruption to the task sequence and which physical or behavioural distractions are automatically disregarded by driver (Sullman, 2012).

Conclusion

Truck drivers can complete most tasks that is allocated to them, in each work period; however, it may not be possible to accurately describe these in the way they are completed by using standalone assessment tools. This is because most of the functions a truck driver undertakes are beyond normal comprehension and cannot be described solely on the assumption that the actions of the truck driver will be identical to the task in terms of its description (Clay-Williams et al., 2015). Whilst this means that if any human factors assessment is to be applied to the truck driving environment it must require a multifaceted approach or be undertaken as a suite of assessments that will allow for the task sequence to be analysed and address all the characteristics that a truck driver may apply during any series within the task.

It may not be possible to develop an human factors assessment tool that completely demonstrates the task sequencing that a truck driver may undertakes and its relationship to the road transport system. Even though it is theoretically probable to extract elements from each assessment tool, the ability to identify how the truck driver applies all the perceptual cues that surrounds the truck to instantaneously plan for any situation may be compromised. Even if all the current assessment tools are combined the response criteria contained in each of these may not be conducive to demonstrate with any clarity what a truck driver does. This is because the response sequence and behaviour and character traits of the truck driver may not be able to be captured in the assessment tool that is chosen.

The assessment tools will need to be adapted to suit the truck driving environment as they have their own unique ability to analyse the task and consider where the perceptual, motor and cognitive functions perform all the information-processing operations needed to drive a truck. However, before this is undertaken, the designer must allow for the premise that every truck driver will continually seek out viable compromises and any decision made will be based on limited information and time. Indicating that to understand truck driving, a more detailed investigation must be undertaken to uncover how the truck driver responds to the nuances found in the road transport system.

Recommendation

It is theoretically possible to develop a human factors assessment tool that demonstrates the task sequence a truck driver may undertake; however, it must clearly examine the role that the truck driver plays. Otherwise, the assessment tool applied to the truck driver and road transport environment will not identify how the truck driver applies all the perceptual cues that surrounds the truck to instantaneously plan for any situation. This means that the assessment tool will need to draw on the foundations of the HTA and the OSD to show how the task sequence flows through to completion. Following this would be to integrate elements from other assessment tools that will be able to identify how the truck driver perceives their mental workload

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and situational awareness through the activity, to document how the planned sequence will present itself over the entire journey, when appropriate actions are to be taken to ensure the load will be delivered as intended.

In constructing an assessment tool for truck drivers that demonstrates the task sequence and recognises where the perceptual, motor and cognitive functions perform all the information-processing operations needed to drive a truck as well as uncover any psychophysiological links to fatigue, the assessment platform has the potential to become overly complex. However, by implementing a naturalistic driving study that includes multiple sensors and cameras in the cabin of the truck, which views both the truck driver and other road users in all driving situations, the assessment framework could start to identify and describe all the functions a truck driver will undertake when driving a truck in a clear and concise document.

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